Amendments to the drawings,

There are no amendments to the Drawings.

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Remarks

Status of application

       Claims 1-44 were examined and stand rejected in view of prior art. The claims have been amended to further clarify Applicant's invention. The Examiner has made additional non-claim rejections, which are addressed by this Amendment. Reexamination and reconsideration are respectfully requested.

The invention

       Applicant's invention comprises a system and methodology for replication subscription resolution. In one embodiment, for example, a system of the present invention for determining subscribers to which a published item of data should be replicated is described that comprises: an interface module for receiving user input of lists of a plurality of subscribers, each list specifying items of data to be replicated to a given subscriber; a build module for building an index based on the lists of the plurality of subscribers containing entries comprising wildcard information and negation information indicating subscribers for each item of data specified in the lists and a default list of subscribers for items of data not matching any of the entries; and a resolution module for receiving a published item of data and determining in constant time subscribers to which the published item should be replicated based on the index, so that the published item may be efficiently replicated for display to subscribers.

General

       Abstract and Claims

       The Examiner states, "The abstract of the disclosure is does [sic] not commence on a separate sheet in accordance with 37 CFR 1.52(b)(4). A new abstract of the disclosure is required and must be presented on a separate sheet, apart from any other text. The title cannot be on the same page as the abstract." The Examiner also complains about the use of the phrase "is described."

       Applicant notes that, in this electronically filed application, the formatting/presentation of the Abstract is actually controlled by the PTO's own "PTO Electronic Stylesheet v. 1.1.1," including the Abstract's pagination as well as placement

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of the title on the same page as the Abstract. Nonetheless, Applicant has provided a word processor-prepared replacement Abstract (i.e., not formatted with the PTO Electronic Stylesheet) that is intended to address the "is described" wording, as well as formatting issues identified by the Examiner.

Similarly, the "Claims" heading is controlled by the PTO-provided PTO Electronic Stylesheet, which was required for electronic filing. Applicant has amended the Claims heading to override the heading text provided by the Electronic Stylesheet. Finally, as to out-of-order claim 41, the affected claims have been renumbered.

Section 101

Claims 1-22 and 41 stand rejected on the basis of nonstatutory subject matter. Applicant has amended the claims to indicate the tangible result of Applicant's invention — specifically, that a given published item may be efficiently replicated for display to subscribers. It is respectfully submitted that that is a useful and patentable advance over the art and that the rejection under Section 101 is overcome.

The Examiner has also rejected claim 41 on the basis of non-statutory subject matter stating that a downloadable set of processor-executable instructions is directed towards software and that software per se fails to produce a useful, concrete and tangible result. The claim has been amended to couch the claim limitation in terms of a process step, thereby overcoming the rejection.

Prior art rejections

A. Section 102 rejection: Zarmer

Claims 1-8, 22-28 and 42-44 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Zarmer et al., U.S. Patent No. 5,625,818 (hereinafter Zarmer). The Examiner's rejection of claim 1 is representative:

As for Claim 1, Zarmer teaches:

A system for determining subscribers to which a published item of data should be replicated, the system comprising:

an interface module (See e.g. col. 5, lines 2-10 and col. 7, lines 5-

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10) for receiving user input of lists of a plurality of subscribers, each list specifying items of data to be replicated to a given subscriber (See e.g. subscribing col. 13, lines 2-10);

a build module for building an index based on the lists of the plurality of subscribers containing entries indicating subscribers for each item of data specified in the lists (See e.g. ObjectMan can search list so it was built - col. 11, lines 12-38) and a default list of subscribers for items of data not matching any of the entries (See e.g. auto-interest col. 22, lines 42-53); and

a resolution module for receiving a published item of data and determining subscribers to which the published item should be replicated based on the index (See e.g. ObjectMan -col. 11, lines 12-38).

Applicant's claimed invention may be distinguished on a variety of grounds.

A problem in current data replication environments having a set of subscribers (e.g., replicate databases) requesting different subsets of data from a data source (e.g., a primary database) is how to efficiently find all of the subscribers that should receive a copy of a particular item published by the data source (i.e., the "published item"). It is not possible to pre-index all of the published items, as the published items themselves are unknown in advance. Prior art solutions typically involve comparing the published item with lengthy lists of subscribed items of each subscriber. Zarmer, relying on a generic publish/subscribe model, gives no indication that it is any different than the prior art in this regard. Zarmer also gives no indication that his system would not require a linear search time proportional to the number of subscribed items.

Applicant's claimed invention, in contrast to prior art solutions, does not require a linear search time proportional to the number of subscribed items. Importantly, in environments having multiple subscribers (e.g., replicate databases) each with a large number of subscribed items, Applicant's solution enables the subscribers that are to receive a given published item to be determined in constant time, even though all of the published items to be replicated are themselves not known in advance. The solution enables subscribers to define the items of data they wish to receive from a primary

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database using wildcards and negations. In this manner, Applicant's invention provides a replication solution that efficiently determines, given a particular item of data published by a primary database, the particular subscribers (i.e., replicate databases) to which the item of data should be replicated.

Turning now to Zarmer, one finds that Zarmer simply provides a very general description of publish/subscribe technology in connection with Zarmer's particular application. Zarmer describes interface level operations, and describes how to publish and subscribe data. Zarmer also mentions an index for routing of messages to destinations, and briefly describes resolution of messages (i.e., to the proper place/destination). Having provided no significant details in this regard, however, Zarmer instead is best viewed as simply providing a very generic publish/subscribe model for distributing information.

Zarmer provides an object management mechanism, including indexing of objects via assigned identifiers. However the foregoing basic object management mechanism is a generic mechanism common to many data distribution systems (including, for example, Sybase's (assignee's) own current and prior Replication Server product), and certainly is not the subject matters ought to be claimed by Applicant's patent claims. More pertinent to Applicant's claimed invention is exactly how an object index is built and how resolution is actually performed. For Zarmer, the object management mechanism employed can essentially be a black box (i.e., generic), as Zarmer's particular invention itself is not tied to (and does not provide a description of) any specific object management mechanism. Importantly, Zarmer chose not to optimize this portion of his system, and instead simply relied on an existing generic mechanism, which is not the claimed subject matter of Applicant's patent claims.

The lack of teaching of Zarmer with respect to Applicant's invention can be illustrated by considering how information can be indexed. Consider, for example, an ordinary database system storing one or more tables of records. There, the records comprise information that has been stored in the database system -- that is, the information is "known" to the system and thus it is simple to create an index of the information (e.g., using B-tree, hash table, or other indexing technique) based on this known information. In the scenario address by Applicant's invention, the information is

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not known as it does not yet exist, and therefore the system cannot simply create an index of the unknown or yet-to-be-created information.

Although Applicant's system does not know the yet-to-be created information, it does know some information in the form of descriptors that indicate the sort or type of information that a given subscriber or recipient wants as well as (optionally) the sort or type of information that a given recipient does not want. These descriptors may be expressed in terms of wildcards and negation. Significantly, this approach is vastly different than the prior art approaches of simply processing linear lists, which have the particular disadvantage that they require a linear search time proportional to the number of subscribed items. By creating an index based on the wildcard and negation descriptors, Applicant's approach requires only constant search time -- one that is independent of the number of subscribed items -- and can thus provide a search time that is substantially faster than prior art approaches.

For each incoming item, Applicant's system can resolve with one hit (i.e., immediately resolve) the exact subscribers the item is to be distributed to, even though the item itself was not known (and therefore not indexed) beforehand. Consider, for instance, an incoming item of "CNN" (e.g., news item from CNN). Applicant's system can immediately resolve the list of subscribers (e.g., users John, Heping, and Christy having descriptor matching "CNN") that that item goes to. No matter how many subscribers have subscribed to "CNN", Applicant's system is able to immediately resolve in constant time the very specific set of subscribers that the "CNN" item is to be distributed to. Importantly, once the index of descriptors is set up, Applicant's system can resolve any item to a specific list of subscribers in constant time.

Applicant's claims have been amended to bring these features to the forefront. For example, amended claim 1 includes the following claim limitations (shown in amended form):

> a build module for building an index based on the lists of the
> plurality of subscribers containing entries comprising wildcard
> information and negation information indicating subscribers for each item
> of data specified in the lists and a default list of subscribers for items of

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data not matching any of the entries; and

a resolution module for receiving a published item of data and
determining <u>in constant time</u> subscribers to which the published item
should be replicated based on the index, <u>so that said published item may
be efficiently replicated for display to subscribers</u>.

As shown, the claim has been amended to highlight the feature that the index is
built using the wildcard and negation information. (Applicant's other independent claim
has been amended in a like manner.) This is in stark contrast to prior art systems that
simply index information or objects based on already-known information. Further, the
claim has been amended to highlight that the resolution occurs in constant time.

All told, it is respectfully submitted that Applicant's approach of building an index
based on wildcard and negation information that allows subscribers searches to be
performed in constant time is a patentable advance over the art. Further, in view of the
above amendments further characterizing Applicant's invention (as well as clarifying
remarks made above), it is respectfully submitted that the rejection under Section 102 is
overcome.

B. Section 103 rejection: Zarmer and Pedrizetti

Claims 9-11, 13-19, 21, 29-37 and 39-40 stand rejected under 35 U.S.C. 103(a) as
being unpatentable over Zarmer (above) in view of Pedrizetti et al., U.S. Patent No.
6,151,708 (hereinafter Pedrizetti). Here, the Examiner repeats the rejection based on
Zarmer, but adds Pedrizetti for the teaching of "a hash table of entries based on the lists
of the plurality of subscribers." The claims are believed to be allowable for at least the
reasons cited above pertaining to Zarmer. Importantly, Zarmer fails to teach Applicant's
approach of building an index based on wildcard and negation information that allows
subscribers searches to be performed in constant time. Nothing in Pedrizetti cures this
deficiency of Zarmer. In view of amendments to Applicant's base claims, it is
respectfully submitted that Applicant's claimed invention distinguishes over these
combined art references.

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C. Section 103 rejection: Zarmer and Collison

Claims 12 and 38 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Zarmer (above), in view of Collison, U.S. PGPub No. 2004/0139166 (hereinafter Collison). Here, the Examiner repeats the rejection above under Zarmer but adds Collison for teaching "wildcards."

Collison describes using wildcard (e.g., pattern-matching) characters for determining subscribers. The use of wildcards per se is well known, and Applicant certainly does not claim to have invented wildcards or the use of wildcards for determining subscribers. Significantly, what Collison does not teach or suggest is the use of wildcards to construct an index that allows determination of subscribers in constant time, as required by Applicant's amended claims. In fact, Collison's use of wildcards in a non-index way -- as well as lack of any description of using an index to facilitate his method -- indicates that he was not contemplating nor was he suggesting that wildcards could be directly used to build an index in the same manner as Applicant's invention. Not only does Collison not cure the above-noted deficiencies of Zarmer, but his use of wildcards in a non-index manner teaches -- if anything -- away from Applicant's invention. Accordingly, it is respectfully submitted that Applicant's claimed invention (particularly in view of amendments to the base claims) distinguishes over the combination of Zarmer and Collison.

D. Section 103 rejection: Zarmer, Pedrizetti, and Collison

Claims 20 and 41 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Zarmer (above), Pedrizetti (above), and Collison (above). The claims are believed to be allowable for at least the reasons cited above pertaining to Zarmer's failure to teach Applicant's approach of building an index based on wildcard and negation information that allows subscribers searches to be performed in constant time. Nothing in Pedrizetti or Collison cures this deficiency of Zarmer. Moreover, Collison's use of wildcards in a non-index manner confirms that Applicant's index-based usage of wildcards and negation is in fact a unique and non-obvious approach. In view of amendments to Applicant's base claims, it is respectfully submitted that Applicant's claimed invention distinguishes over these combined art references.

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Any dependent claims not explicitly discussed are believed to be allowable by virtue of dependency from Applicant's independent claims, as discussed in detail above.

Conclusion

In view of the foregoing remarks and the amendment to the claims, it is believed that all claims are now in condition for allowance. Hence, it is respectfully requested that the application be passed to issue at an early date.

If for any reason the Examiner feels that a telephone conference would in any way expedite prosecution of the subject application, the Examiner is invited to telephone the undersigned at 408 884 1507.

Respectfully submitted,

Date: November 17, 2006

Digitally signed by John A. Smart
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